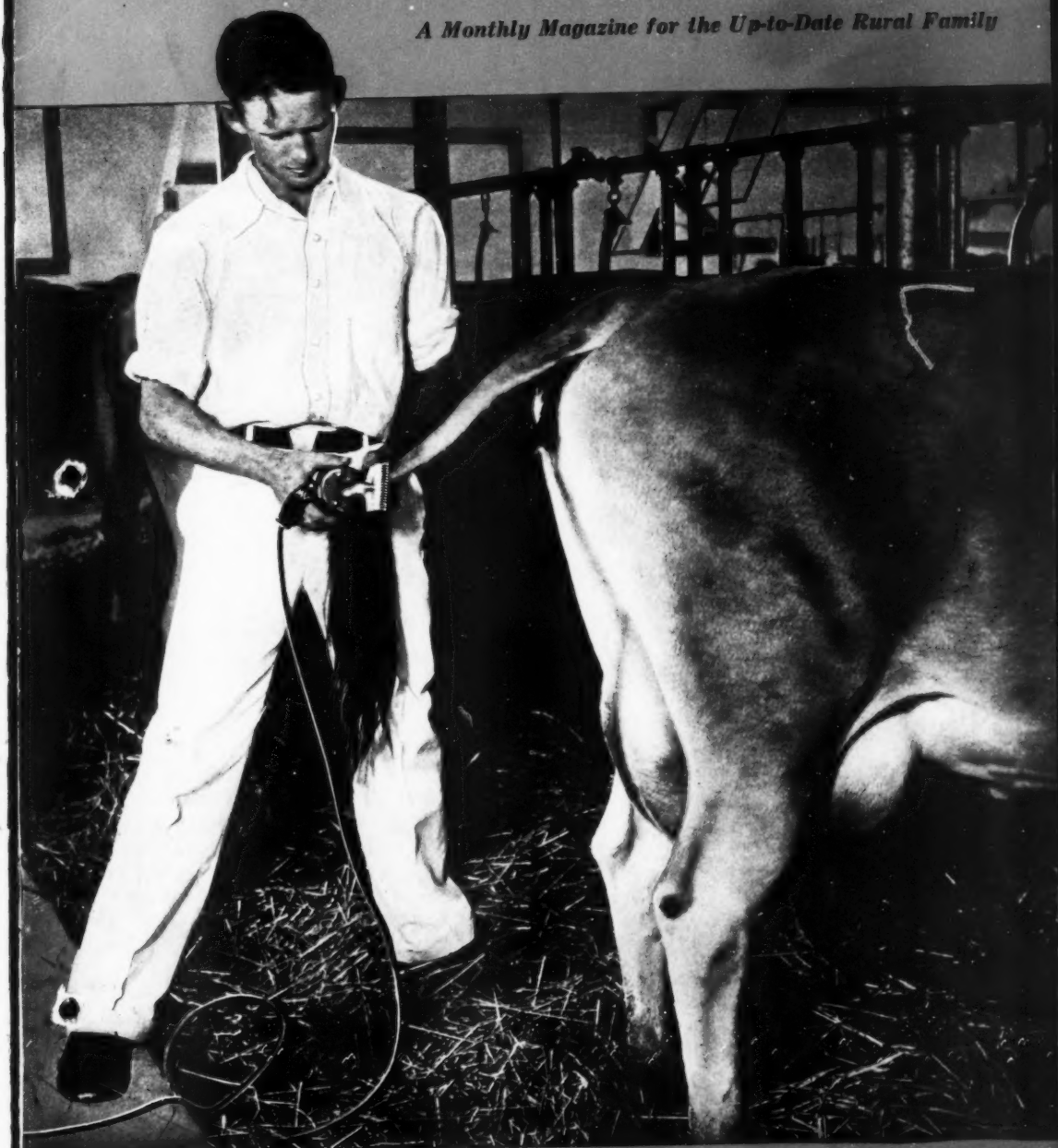
Electricity on the Farm

APRIL
1933

A Monthly Magazine for the Up-to-Date Rural Family



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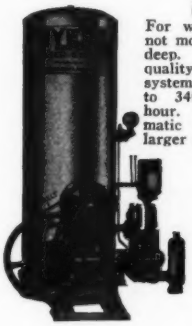

Fig. 2510
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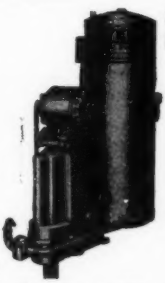

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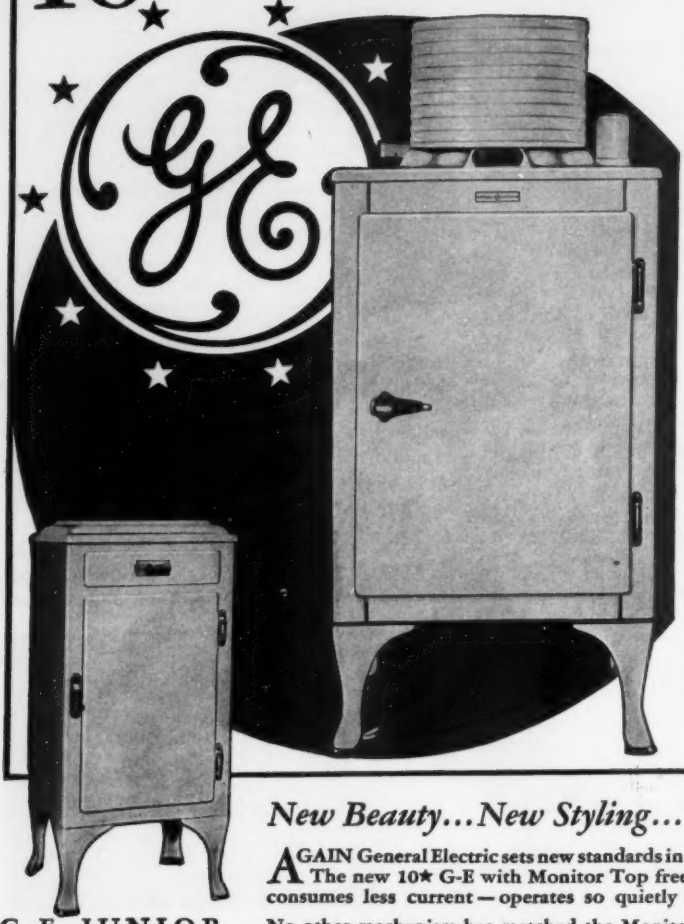

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April, 1933

Electricity on the Farm

Vol. 6. No. 4

IN THIS ISSUE

Automatic Water Supply—The Greatest Convenience

BY E. W. LEHMANN

The installation of an automatic water supply system on the farm should be considered by every farmer having electric service, or contemplating securing such. On page 6, Mr. Lehmann discusses the various types of pumps and pumping systems, and tells how to select equipment of proper size.

Forcing Vegetables the Modern Way

BY MAURICE W. NIXON

A Norway nurseryman is said to have been the first to adopt electricity for heating of hotbeds. But the American farmer and gardener are rapidly realizing the advantages over other types of soil heating. Read the article on page 8, wherein Mr. Nixon tells how to construct an electric hotbed.

Feeding 10,000 Lambs

BY R. R. ROWELL

On page 10 will be found the story of an electric motor and hammer mill that helped feed 10,000 lambs. Their part in this huge task was the grinding of grain used in the daily feed ration. A smaller motor is used in connection with the water system.

Making Dollars on the Poultry Farm

BY E. C. EASTER

Windhill Poultry Farm in Mobile County, Alabama, increased profits from egg production by lighting the poultry houses. On page 11 the author gives figures for comparing results in lighted and unlighted poultry houses, as secured on this farm.

What Wire Shall I Use?

BY H. J. GALLAGHER

To get the best results from electrical equipment, the feeder circuit must be constructed to meet the demand of the apparatus supplied. H. J. Gallagher on page 11 explains the various factors entering into the layout of such circuits.

Regular Monthly Features

Electrical Housekeeping, page 13; Questions and Answers, page 18; On the Air, page 19; What's New, page 21; Under the Chestnut Tree, page 22.

EDITORIAL

DUE to depreciated foreign currencies, great numbers of inferior foreign-made electric light bulbs are finding their way to American markets.

They look like the high grade American product, with this difference: they do not bear the trade mark, or manufacturer's name, which appears on those made in this country.

Because they sell for less, many are being purchased by those who do not know the tremendous difference in current consumption of the two. An inferior electric light bulb can waste enough current during its life to do the washing for 6 months in an electric washer or to operate a vacuum cleaner with usual frequency for a whole year.

The initial price paid for a lamp represents only 10 per cent of the total cost of light. Illustrating this, a 50-watt lamp of inferior make was tested in a laboratory equipped to make tests on illumination. It cost only 10 cents to buy and it lived three and a half times as long as a standard American-made lamp, but operated at such low efficiency that it wasted during its lingering life $3.90 worth of electricity for which no value in light was received.

Thus the use of such bulbs is extremely costly. Their purchase is a conspicuous example of false economy.

Because all lamp bulbs look alike the only way to tell the difference between a high class and inferior bulb is to look for the trade mark of a reliable manufacturer on the end of the bulb. Do this when you buy, and you may then be sure you are getting illumination at the lowest cost.

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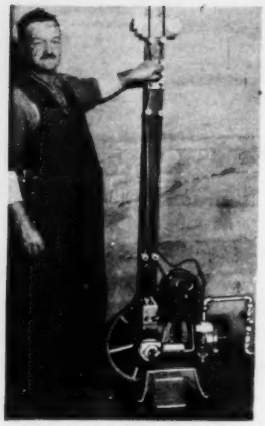


Ready for action is the C. F. Eggers water system.

AUTOMATIC WATER SUPPLY—

the Greatest Convenience

By E. W. LEHMANN
Prof. of Agricultural Engineering
University of Illinois

AN electric water system, with an adequate and pure water supply is to the farm home what city water pressure at the street curb is to the city home. Although complete water service is needed in every farm home, the desire for this type of service has not been felt keenly enough to result in its fulfillment. A comparison of the number of farm homes now equipped with water systems with those having radios and automobiles indicates that water under pressure has been put third or fourth place by too many farmers. On the other hand, rated as a labor saver by the majority of farm women it is the greatest convenience which electricity can bring to the home.

Dependable Water System Essential

The need for a convenient, satisfactory water supply is universal. It always was and always will be. Our earliest historical writings are filled with references to water supplies. Towns and cities and individual homes were located with reference to water supplies. One of the first demands of the buyer or renter of a city home is that it be modern. To be modern it must have water under pressure. After living beyond the limits of the city where water could not be secured from the city supply and after depending on an electric system to furnish it for ten years, I am convinced that the electrically operated water system is the most reliable now available to rural residents. An electric water system, providing water under pressure, makes it possible to have the farm house equipped with plumbing, sanitary fixtures, and to have a safe system of sewage disposal. The completeness of the outfit is important in securing the greatest benefit from it.

There are two types of electrically operated pumps in use—the shallow well or suction pumps, and the deep well or lift pumps. The suction pump is usually located in the basement and is capable of drawing the water from a depth of 20 to 25 feet. Ordinarily this type of pump should not be placed more than 22 feet above the lowest water level. A one-quarter horse power motor is usually large enough to operate the average shallow well water system. The cost of operating such a unit is very slight, due to the small size motor required.

The deep well electric pumping unit or deep well head as it is usually called differs from the shallow well unit in that it is placed directly over the well with the cylinder down in the well, preferably 15 to 20 feet below the normal level of the water. In such an installation the pressure storage tank, control switch and other accessories are usually placed in the basement. A deep well pump usually requires one-half horse power motor or larger, depending on the depth of the well.

The automatic switch is the feature which puts the electric water system in a class all by itself. It controls the system and maintains pressure with almost no personal attention. The gravity storage system uses a float to operate the automatic switch, while in the closed tank or hydro-pneumatic system the pressure itself operates the switch. As the

Automatic pump and pressure tank on the Dow Riggs Farm, Dallas County, Texas, in a frame pump house.

pressure increases, when the pump is working, it opens the switch. As water is used and the pressure is reduced a spring closes the switch and the pump starts.

Either the shallow or deep well hydro-pneumatic system may be equipped with a fresh water attachment. The most common arrangement is to have a tee fitting between the check valve and the automatic control switch. A pipe is connected from the tee to the fresh water hydrants at the kitchen sink, and in the bathroom. In operation, when a fresh water hydrant is opened, the automatic switch closes immediately, the pump starts and water is pumped directly to the hydrant without going through the tank.

The size or capacity electric pumping unit, and storage tank to select depends on: (1) the supply, (2) the needs of the household, and outside needs, (3) whether it is to be operated automatically or by hand, and finally (4) the degree of fire protection.

Well Capacity Determines Pump Size

With a well of adequate capacity a larger pump can be used to advantage, with a reasonably small storage tank. If the water flows into the well slowly then a smaller capacity pump should be selected with a larger storage tank. Many water systems have been condemned because of high energy consumption per thousand gallons pumped, and slow rate of pumping when the inefficiency of the system was due to a poor well and not to the pump. The rate of flow into the well or other source of supply should be known as well as the rated capacity of the pump.

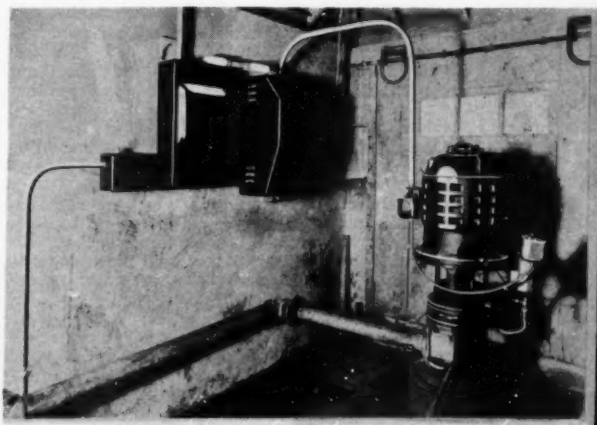
If a complete plumbing system is provided and there is more than one bathroom, with an extra toilet and wash room, besides sill cocks for sprinkling the lawn, it is essential that a pump of several hundred gallons capacity per hour be selected. However, as stated before, whether the water should be provided by a larger pump or a smaller one with greater storage capacity is dependent on the source of supply. Both adequate storage and pump capacity are desirable for a maximum of fire protection. However, a hose delivering a flow of only five or six gallons of water a minute will put out an ordinary fire, if discovered in time.

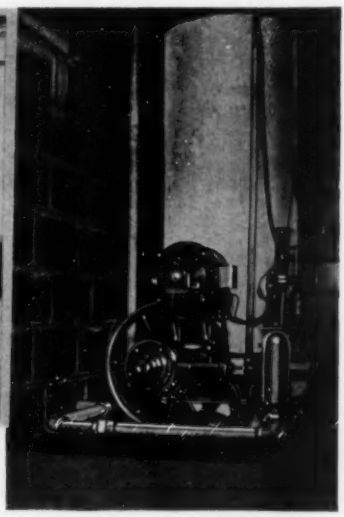
It requires a large flow of water to put out a big fire. For this purpose a rather large quantity of water must be furnished, in part by storage and in part by pumping. A 2 H. P. motor is probably the smallest that would be practical to give reasonably good farm fire protection. It should not be overlooked, however, that most farm fires that result in serious damage are those which occur when no one is at home. A special high pressure high capacity pump would be of no value if no one was at home to operate it. The value of a pump with ¼ H. P. motor with some one at hand when the fire starts should be recognized.

Where a good deep well pump is already available, operated by a gas engine or windmill, it can be easily changed to electric motor drive by the use of an electric pump jack. This is the first step on many farms toward a complete system. Some jacks are belt or chain driven; however, there are others that are direct connected. It is essential that a sufficiently large motor be provided.

A very inexpensive but satisfactory electric water system which would appeal to many farmers, but does not have all the features of a complete system, has been used by one Champaign County, Illinois, farmer for a number of years. He has a deep well pump operated by a pump jack and controlled by three switches, one at the stock tank, one at the pump, and the third at the kitchen sink. Three point switches are used at the kitchen sink and at the stock tank and a four point switch is used at the well. Faucets are provided at the two lowest points; at the highest point the pipe is left open. Whenever he wants the water he simply turns the switch and opens the faucet. If both faucets are closed the water will come to the upper end of the pipe.

The cost of pumping is often less than 5 cents per thousand gallons. Labor used for pumping must be cheap indeed to compete with an electric pumping system. There are few things that will do so much for the home at so little cost as a water system.

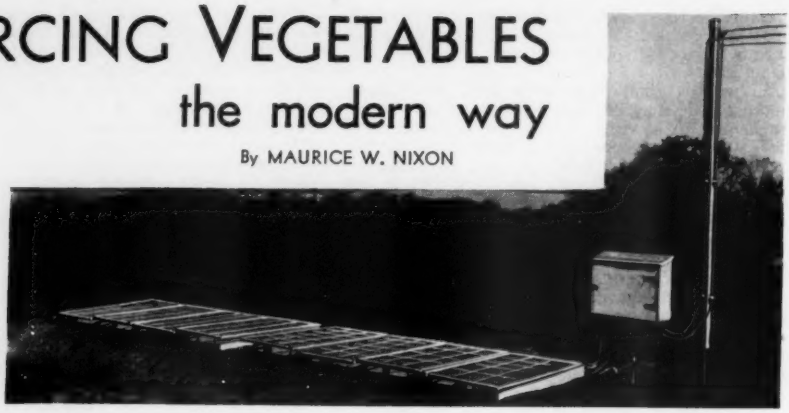




Above: A 10 H.P. driven centrifugal pump on the Boulder Bridge Farm, Minnesota, supplies water for livestock and domestic consumption. Right: The farm water system can be accommodated in a very small space.

FORCING VEGETABLES
the modern way

By MAURICE W. NIXON



General view of electric hotbed at Cornell University.

ELECTRIC heat for hotbeds promises to provide a new way for the gardener to start and force early vegetables. The original idea seems to have come from Norway, where one G. Jacobsen observed that the ground surrounding heavily loaded underground cables was so warmed that it enhanced crop growth nearby. In 1922 Jacobsen undertook to heat the soil in a nursery directly by live wires. The idea immediately spread to Sweden, where the Royal Board of Directors of Waterfalls became interested and set about developing electrically heated hotbeds to a point of practical usage.

In the spring of 1927 there were some thirty installations in Sweden, aggregating 53,500 square feet in area. The most northerly one, some 3,200 square feet in area was located about 100 miles north of the Arctic Circle. The largest hotbed covered some 13,900 square feet near Stockholm and was supplied through two 100 kilowatt transformers. Two years later there were nearly three hundred such hotbeds in use; covering an area of more than 215,000 square feet and aggregating a 3,000 kilowatt load.

The development advanced rapidly in Norway during the same years, and by December 31st, 1929, 5,235 or about 12.3 per cent of the 42,621 sash in nurseries were electrified.

Advantages

1. Always ready to use.
2. Clean and agreeable to work with.
3. Free from ammonia fumes.
4. Low operating and maintenance cost.
5. Independent of outside temperature.
6. May be converted into cold frame merely by turning off power.
7. Temperature does not fall off after 4 to 6 weeks as is characteristic of manure hotbeds.
8. Permanent installation — Hotbed frame will last several years before decay makes replacement necessary. Only necessary to renew topsoil

The market gardener as a rule has better control over the factors which influence vegetation than the farmer. Through forcing under glass he can partially regulate humidity, light, and temperature conditions. We can all appreciate how readily electricity lends itself to the regulation of these factors; not to mention the various advantages as cleanliness, freedom from ammonia fumes, uniform regulation, ease of operation, and finally automatic control.

The electrically heated hotbeds may be constructed and installed so as to be permanent. Properly made up they will last a number of years because there will be no strong acids and excess ground water to rot out the woodwork.

Under an electric hotbed a layer of insulating material should be laid to prevent the escape of heat to the earth. A great saving in energy consumption may be gained by insulating. The cost of insulating would be of minor importance since it could be used several years, and the advantages are great. Cinders and charcoal both make good insulators. Charcoal has the added advantage of liberating carbon dioxide when heated slightly. Charcoal was used in Sweden because it served the two purposes. Charcoal was rather expensive and cinders were relatively cheap, so they were chosen for use in New York.

Construction of Foundation

A shallow pit was dug about two feet longer and two feet wider than the length and width of the hotbeds, and about two feet deep. This pit was filled to a depth of one foot with cinders, and the hotbed box built on this foundation. The box was about 18 inches high on the north side and sloped downward to about 12 inches on the south side. For a permanent installation it should be made of one and one half inch tongue and grooved boards well painted

A number of burlap bags were cut open and spread over the cinders inside the frame and then about 1 inch of sand spread over the burlap. The burlap was to prevent the sand from filtering through the cinders, and if undisturbed will retain its effectiveness for some time. The sand was very effective in distributing the heat from the heating cables uniformly over the bottom of the soil surface as sand is a very good conductor of heat. After the heating cable was laid out over this sand and connections made a second layer of sand was spread evenly over the cable and carefully packed down. The hotbed was then ready for the soil.

About five or six inches of soil was used in the hotbeds. This solid layer of soil was found to have a more uniform moisture and temperature distribution than flats containing soil. Besides,

considerable heat escaped between the flats without passing through the soil. Therefore, the use of flats is discouraged.

The heating element consisted of a No. 23 gauge lead sheathed heating cable especially designed for soil heating. This cable had a resistance of 610 ohms per thousand feet and was designed to be cut into sections 72 feet long and connected directly across 115 volts to deliver 300 watts of heat.

This cable may be very easily installed in hotbeds having 4 sash or any multiple of 4 sash as 8, 12, or 16. It may be used in beds of other sizes by varying the length of the cable slightly which will effect the wattage somewhat. When placing this cable in a hotbed care should be taken to space the wires about 6 inches apart to give uniform temperature and heat distribution. In any case the cables should not be more than 8 or 9 inches apart. In most cases it is possible to alternate two heating wires and thereby secure two steps of heat. The low operating temperature, sheathing, and stable alloys used, all tend to make the heating unit last indefinitely. Therefore, the units may be installed permanently and left undisturbed for several years. An annual inspection of the terminals and connections however, would be desirable.

Two Steps of Heat Desirable

By experimental work conducted for several years in New York State is has been found that two steps of heat are desirable. The higher step should be about 150 watts per sash. (About 18 square feet in area). This will be sufficient unless the gardener wishes to keep the hotbed soil very warm for some special purpose. During the warmer weather of late April and May it is desirable to have some heat but not the full amount. A low step of 75 watts per sash was easily provided and proved useful.

The heaters may be controlled manually by the operator or may be controlled by a thermostatically operated switch which will make the installation automatic and maintain a very uniform temperature in the soil.

Although the necessary equipment for automatic regulation would be rather expensive for small installations, it would soon pay for itself in close regulation and by saving electric energy in large hotbed installations operating at one temperature. An additional set of control apparatus would be necessary for each section intended to be operated at a different temperature. During a cold period it would not be economical to keep the high temperature in the hotbeds. It would be sufficient to carry them over an extremely cold period without damage to the plants.

The high thermal capacity of the bed soil made it possible to store heat in the ground when it was warm, to be used when the ground was colder as during the latter part of the night. Closely allied with this was the possibility of using low wattage heaters and operating them over a long period of time. By this means, heat energy was stored in the ground during the warmer parts of the day and used during cold periods when the supply was not adequate to meet the radiation loss. This action was evidenced by the fact that the soil was gradually warmed when the day was warm and gradually cooled when the day, or usually night, was cold. This characteristic was recognized and employed by the Swedish and German experimenters, as they used off peak current for hotbed heating.

Construction Costs

The cost of constructing an electric hotbed is rather difficult to determine because much of the material used in it may be found around the farm. If not, the necessary lumber may be easily estimated and priced. The cinders usually cost little or nothing other than the cost of carting them. The most important item of cost is that of the heating element, thermostat, switch and current supply to the hotbed. At the present time the wire for a four sash hotbed would cost somewhat less than nine dollars in small quantities and a thermostat about ten dollars.

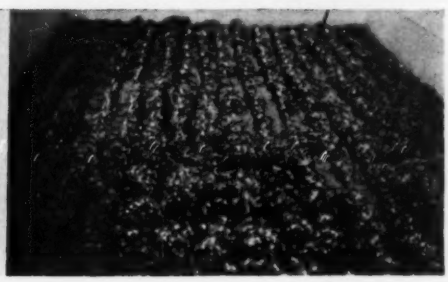
The operating cost of an electric hotbed is much lower than one at first assumes it will be. Hotbeds started about March 15th may be expected to consume from 25 to 40 kilowatt hours per sash for the remainder of the season. The energy consumption depends almost entirely on two factors, the seasonal conditions and the temperature at which the operator keeps the soil. The usual practice is to hold the temperature very high (80°F) for a week during the germination period and then to lower it to 65° to 75° according to the needs of the crop being grown.

It has been found that a cubic yard of good manure was equal to 88 kilowatt hours of electrical energy for heating. At this rate, for the heating value alone, one could afford to pay one cent per kilowatt hour for electric energy for each 90 cents per cubic yard which manure would cost him. He could really pay more considering the

(*Continued on page* 12)

A sixteen sash hotbed, showing the layout of the heating cable.

Cabbages in electric hotbed were ready to transplant at eighteen days.



FEEDING 10,000 LAMBS

By R. R. ROWELL

MR. HOFMAN of the partnership of Hofman and Nicolas, has established a feedlot for 10,000 lambs at Menoken Siding, located on the Denver & Rio Grand railroad, approximately 5 miles north of Montrose, Colorado. The ration used at the Menoken feedlot consists of approximately three pounds of ground alfalfa, one pound of ground corn, and five pounds of sugar beet pulp, per lamb, per day. This ration, of course, varies throughout the feeding period, especially during the last week or two before shipment.

Feed Ground by Motor Power

Electric power is used for the feed grinding operation. A 50 h.p., three phase 220 volt, G. E. induction motor is belt connected to a 24 inch W. W. Hammer Mill, which runs at approximately 3,300 r.p.m. A motor as large as the 50 h.p. is not required, since the measured demand has not exceeded 40 h.p. This grinding outfit operates on the average of 10 hours per day and grinds approximately 1½ tons per hour of alfalfa and corn, to a fineness that passes through a 3/16" screen. The proportion of this ground feed is approximately 10 tons of hay to 3 tons of corn.

The average electrical energy for grinding at the rate of 1½ tons per hour is found to be about 18 kwh. This average figure takes into consideration the weather, damp alfalfa, time delay in maintenance of the equipment, and other variable factors.

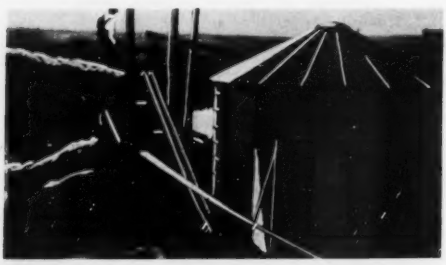
A test run was made over a period of several days with the following results:

113 tons of alfalfa ground to fineness of 3/16" screen
28 tons of corn ground to fineness of 3/16" screen

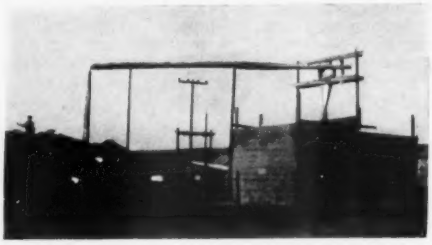
141 total tons of ground feed

2,075 kwh. were used for this test, or 14.7 kwh. per ton. This test was conducted over a period in which the weather was ideal. The alfalfa ground was of the first cutting, and other conditions were average, or above, during the test.

One very interesting feature of the grinding operation is the fact that one man alone does all the grinding. He feeds the alfalfa to the mill from the hay racks which have been left by the haulers. He oils and takes care of the motor and grinder. An automatic gravity feeder feeds the corn into the mill at the same time the alfalfa is going through. The ground feed is conveyed by means of the blower, which is a part of the mill, to the ground feed storage bin. The average labor cost for grinding the feed is 30 cents per ton, in addition to the cost of electricity.



A small conveyor carries the corn to the mill where it is ground together with the alfalfa.



One man grinds fifteen tons of alfalfa and corn daily.

The operator must watch the hammers in his mill, and keep them sharp. Dull hammers increase power and labor costs. He sharpens the hammers in this mill for approximately every 150 tons of alfalfa ground. This of course varies with the actual conditions of the hay and the amount of rocks and other foreign hard substances that get into the grinder. He believes that it requires about 20% more power to grind a third cutting of alfalfa than it does for the first cutting. In sharpening the hammers he has found that after the hammers are drawn out and tempered, the use of "Steelite" properly applied, greatly improves their wearing qualities.

Mr. Hofman declares that it pays to grind the feed. In order to put more pounds of weight on the lamb it is necessary for the lamb to eat more. If the feed is not ground, the lamb eats the leaves and wastes the stock. But if the alfalfa is ground, the lamb eats the entire mix, eats more, and wastes less. He also states that he finds it actually no more costly to grind the feed than to feed the alfalfa unground. The reason for this is that it requires considerable labor to distribute the long hay than is necessary for the ground feed.

Mr. Hofman is pumping water for these lambs with a ¾ h.p. motor. His lift is from 20 to 22 feet and his power cost to pump water for 10,000 lambs for 30 days has amounted to $9.05. He pumps on the average of 12 hours per day, and the pump discharges at the rate of 25 gal. per minute. He states that at the present time there is considerable waste to the water that is pumped, but steps are being taken to remedy this situa-

tion, which will further reduce the power cost for water pumping.

For lamb feeding on the Western Slope of Colorado alfalfa is available at or near the feed lot. At the present time corn is shipped from Nebraska. However, if this industry develops, no doubt this item of the ration can be produced locally. The location is close to the summer range, therefore a minimum of shrinkage occurs in transit to the feed lots. Also, the proximity of a sugar beet factory makes beet pulp available at a minimum cost. These factors in a way offset the high freight rates to the Kansas City market, and make this industry worthy of consideration among the sheep men of this territory.

Making Dollars on the Poultry Farm

E. C. Easter

THE Windhill Poultry Farm in Mobile County, Alabama, had two houses of hens of the same age and breed. At one house five 60-watt lamps were turned on each morning to make the hens' working day about thirteen hours long. And each evening after the hens had gone to roost, fresh water and grain feed were put in this house for the hens on the following morning. At the other house, no lights were used, and the hens were fed, after getting off the roost at daylight, with the same kind of feeds that were fed to those in the lighted house.

According to Mr. McIntyre, the manager of this farm, the 360 hens in the lighted house produced

This Michigan poultry farm employs both interior and exterior illumination.

571 dozen eggs *more* than the 353 hens in the unlighted house during the five months from August through December. The hens in the lighted house ate 1,290 pounds more grain and mash than those in the unlighted house, and 90 kilowatt-hours of electricity were used during the five months for lighting.

After paying for the additional feed and for the electricity used, Mr. McIntyre realized a net increased income of $186.00 from the use of the electric lights. He sold the eggs at an average price of 37.9 cents per dozen, and realized an increased net income of about $51.00 per 100 hens in the lighted house.

This increased income from using electric lights made it possible for his wife to enjoy the convenience of an electric range.

What WIRE shall I use?

H. J. Gallagher

NO piece of electric equipment can operate properly unless it receives a sufficient flow of current. The flow of current depends on the kind of wire, its size, its length, and the voltage of the system. The voltage of the system is not within the customer's control, so we will discuss the kind, size, and length of the wire to be used in carrying current to motors and appliances.

The wire should be copper, because copper offers the least resistance to the flow of electricity and therefore wastes the least current in the wire itself. For extension cords and portable cables that should be flexible, it is best to use stranded instead of solid copper wire. Iron wire is often used for local telephone lines, but should never be used for electric distribution. It takes too much power to force the current through it.

The size of the wire is very important. The larger the wire the more current it can carry. Consequently, the more current needed for any job, the larger the wire must be. If the wire to a motor is too small, the flow of current is restricted, just as the flow of water is reduced in a small water-pipe. As a result the motor starts slowly, runs sluggishly, and overheats readily.

Relation of Length to Size

The length of the wire bears a close relation to its size. That is, the longer the wire, the bigger it must be to carry the same amount of electricity. Or, put the other way, the shorter a wire of any given size is, the more current it can carry. The practical application of this fact is that the nearer any appliance can be placed to the source of current, the smaller the wire may be; and the farther away it is, the larger the wire must be.

For farm wiring problems, we may consider the entrance switch or the distribution panel as the source of current. The transformer should not be located so far away or connected by such small wire that it cannot supply plenty of current at proper voltage. The wires from the transformer to the farmer's main switch (usually put in by the power company) are ordinarily large enough to serve the expected load. But if more equipment is added, it may be necessary to move the transformer nearer or put up heavier wire.

The accompanying chart offers a simple and rapid method of finding the proper size of wire to supply various amounts of current at different distances. Each curve on the chart represents a standard size of copper wire. The quantities of electricity to be carried, expressed in amperes, are laid off along the left side, each horizontal line representing one ampere. The distance from the distribution box to the motor or other load is given at the bottom in two rows of figures. The top row applies to 110 volt service and the bottom row to 220 volt service.

A few examples will illustrate the use of the chart.

No. 1. Suppose we want to carry current 300

feet to run a 5 H.P. motor. What size of wire shall we use?

We will look at the name-plate of the motor to see how many amperes it takes at 220 volts. All motors of ½ H. P. or more should be run at 220 volts. Suppose the name-plate says 25 amperes. On the left side of the chart find the line for 25 amperes, and follow it out to the right across 3 of the larger squares till you are directly over the figure 300 in the lower row of distances. The lines for 25 amperes and for 300 feet at 220 volts cross between curve No. 6 and curve No. 8. This means that No. 8 wire is too small for this job and that No. 6 must be used. A pressure of 220 volts would carry 25 amperes about 50 feet farther than this over No. 6 wire. But No. 8 is limited to 18.5 amperes at 300 feet and this is not enough to give full power to our 5 H. P. motor.

Effect of Distance on Current

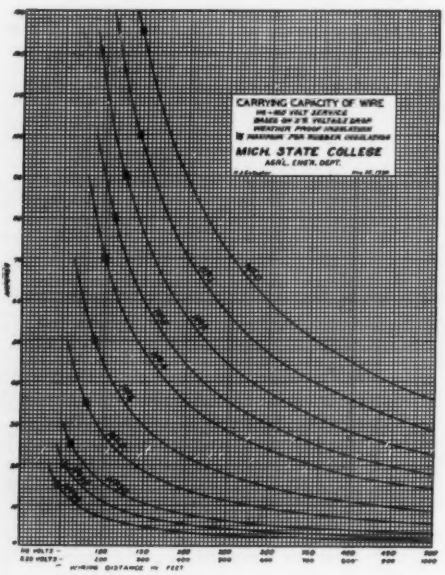
The effect of distance on current carrying capacity is plainly shown on this chart. For instance, the No. 6 wire can carry 50 amperes about 180 feet. But when the distance is increased to 600 feet, the capacity drops to 15 amperes, or about enough for a 3 H. P. motor.

No. 2. How far will No. 14 wire conduct current for a 110 volt ¼ H. P. motor?

Suppose the name-plate of the motor shows that it takes 4.5 amperes at 110 volts. Therefore, we follow the No. 14 curve till it runs between the 4 and 5 ampere lines. That happens right above 150 in the 110 volt row of distances, which means that 150 feet is the limit for No. 14 wire under these conditions. If we have lots of No. 14 wire and want to use the motor farther away, we must shift our connections so as to use 220 volts. Then we can go 300 feet from our source of power.

No. 3. What size wire will supply current to three 40-watt lamps and a 600-watt heater in a poultry house 200 feet from the distribution box?

Three 40-watt lamps equal 120 watts; with the 600-watt heater that makes a total of 720 watts.



Dividing 720 by 110 (the voltage) we find that it takes 6.5 amperes. Now on the chart, going up the 200-ft. line till we reach 6.5 amperes, we find that it is above the No. 12 curve and below the No. 10. Therefore, No. 10 is the size to use. If we try to save a few cents by using No. 12, our lamps will burn dim when the heater is on, and the heater itself will not give good results.

No. 4. If the wires are already installed so their size and length is settled, we can learn from the chart what loads they will carry. Suppose we have a No. 10 circuit to a building 100 feet from the main switch. How large a motor can we operate there?

The motor will operate at 220 volts. So we will read off the amperes from the chart opposite the point where the No. 10 curve crosses the line for 200 feet at 220 volts. This is a little above 15 amperes which would ordinarily be enough for a 3 H. P. motor.

Motors are often expected to carry enormous momentary overloads and call for extra current duing these periods. If the wires are too small, the motor will respond less freely to overload demands. When in doubt about which of two sizes of wire to use, it is a good rule to choose the larger size. With the growing use of electric service, such a choice is likely to prove most economical in the long run.

Electric Heat for Hotbeds

(*Continued from page 9*)

saving in replacement, amortization costs, and the many advantages offered by the electric hotbeds. Electric hotbeds as now used are competing favorably with manure hotbeds in cost of operation, let alone such advantages as automatic uniform temperature control and good drainage.

There is nothing unusual about the operation of electrically heated hotbeds except that there is a chance to have uniformly regulated temperatures. The bedsoil should be prepared as any hotbed or garden soil, and kept in good tilth. Somewhat more water was required than in manure hotbeds because the drainage was excellent and free water percolated through the bed immediately and was carried off, leaving only the capillary and hygroscopic water in the soil which was an ideal condition for plant growth. When automatic control was used much less attention was required than was necessary for manure hotbeds.

Government Weather Bureau predictions were desirable to follow because they gave an indication of the approach of warmer or colder weather and the heater capacity was regulated accordingly, often before the new condition was felt within the hotbed. The twofold advantage of this was the saving of current upon the approach of warmer weather, and storing more heat in the hotbed upon the approach of cold weather.

The electrically heated hotbeds provide an economical means of forcing plants early in the spring before they can be set out into the garden.

He'd Try Anything Once

"The next person who interrupts the proceedings will be sent home," declared the judge.

"Hooray," yelled the prisoner.

A. D., 1933

"Say, Bill, if you had five bucks in your pocket, what would you think?"

Bill: "I'd think I had somebody else's pants on."

ELECTRICAL HOUSEKEEPING

Conducted by GAIL MEREDITH

This heater keeps the bathroom cozy.

A HANDFUL OF HEAT

IF "climate lasts all year round, but weather stays just a few days at a time," it looks to me as though we were not even having weather at this time of the year. Certainly no one sample stays for days at a time.

That is why spring finds us housewives yearning for a heating system we can turn on and off as we will, for just a handful of heat we can carry around the house to make a pleasant warmth when we are bathing the baby, where the children are dressing, or on the floor of the living room when they come in to play, or perhaps over in the corner where Grandma sits to sew carpet rags for a new crocheted rug.

I know some women who could use quite a little extra heat out in their roadside stands when they first open up in the spring, before the sun gets really warm.

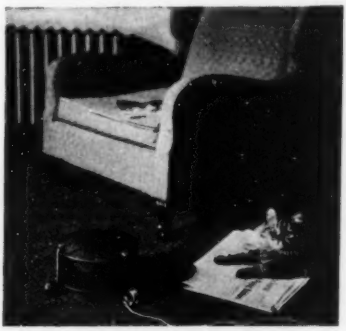
Perhaps you may want a little out in the brooder house on nights when the wind comes up and a blizzard threatens. Maybe your husband could use some in the farrowing pens to keep the young pigs warm.

That is what electric heaters are for.

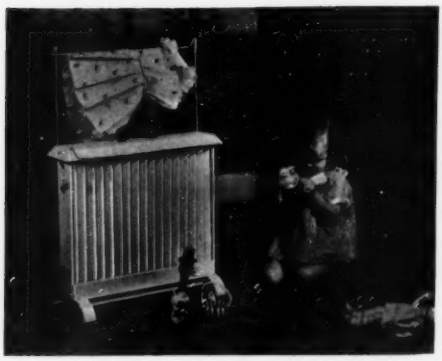
They are portable heat when fires are low, or out. They are small enough to carry around in one hand, but they are big enough to warm you up in a hurry, and to heat a small room if need be. They start at once when you plug the cord into a convenience outlet; the fire goes out as soon as you pull the plug. That is a heating contrivance you can adapt to the swift changes of the spring weather itself.

There are three kinds to choose from: heaters that give off radiant heat, those that warm the air and let the natural air currents set up by the difference in temperature waft it about, and those that heat the air and blow it about with a fan.

I know you are familiar with the round metal bowl of the reflector heater. These heaters warm you up the minute you turn them on and get in line with their glow, and you do not have to stand around in front of them, either. You can direct their heat as you can direct light, by changing the position of the heater bowl, and make them hit you whatever you are doing.



A comfortable spot for a quiet evening.



A heater in the form of a radiator.

These heaters are light and well made. The base is weighted so they do not readily tip over, and if they should, the wire guard over the face of the bowl keeps the heating element off the rug. This same guard protects hands and clothing from burns. The wattage of a heater like this is usually 660 watts, though some models do use 1000 watts.

The air heaters really change the temperature of a room, so they are built for higher wattage, 1100 to 1320 or 1500, to take care of this bigger job quickly.

They come in different shapes. One is an enclosed box-like affair made of metal grained like walnut or finished in ivory lacquer. It is about

two feet high, a foot wide, and six inches thick. It is light, just over ten pounds, and has a well placed handle to carry it by. The metal body never gets too hot to touch, so the top of the heater can be used to set things on.

The heating element is behind an open grid near the top of one face of the heater. Cold air comes in at the bottom, passes over the red hot wires and out through the grid or register.

Another convection heater is built like a small radiator, about two feet high and almost as long. It measures nine inches from front to back. It is made of rust proof steel and finished in bronze or colored lacquers. Like the former heater, it is built so all of the exposed metal is at a safe temperature; it will not burn either clothing or hands.

In this heater the wiring is divided so there are two circuits, and each one is furnished with a switch of its own, so you can use the entire capacity of the heater on cold days, or just half of it when the weather is mild.

There are rust proof, telescoping rods on each side of the top of this heater. They pull up to form drying racks. Dishtowels, the baby's clothes, silk underwear or handkerchiefs will dry quickly in the warm air that rises from the heater.

One of the heaters that warm the air and fan it out into the room is encased in green enameled steel, and has an open grid across the front. It stands just over a foot high and weighs just under ten pounds, so you can easily carry it about by the hand hold on the back. The fan is behind the heating coils. It draws the air in through louvers across the back and blows it, warmed by some 1000 watts of current, through the grid in front.

Two other air circulating heaters I have found look quite different. Both are built like a drum, but one is a drum mounted on a broad round base with a swivel joint that lets us point it in any direction, and the other is a drum laid down on its side with three little metal legs to keep it off the floor. The first of these works like the one already mentioned, the cold air comes in at the back, passes over the heating element, and is blown out into the room by the fan mounted behind the coils. This heater is finished in gun metal with a band of chromium plate around the side.

A cabinet type heater which is but two feet in height.

The heating element in the second one is a flat metal ring enclosing a little fan of special design. The upper drum head is solid bronze finished metal, but the body of the drum is wire mesh.

This heater sends out a steady, gentle flow of heat in all directions, even back down to the floor. The cold air is drawn up and over the heating element and then drifts out through the open meshes of the wire guard in every direction. The heater is so low that it can be slipped under a chair, a table or desk.

The fans of these heaters run very quietly, and are built so they give no radio interference. Practically all the care such heaters need is a drop of oil for the fan a few times a year.

One of the circulator type heaters which make quick work of warming up the chilled atmosphere of a room.

• • •

ELECTRIC WASHERS

WASHING machines are better looking than ever this year. Tubs are finished in cream, green, or white enamel or a heavy lacquer, and the base and trimmings are made of cast aluminum or some alloy that will not rust. One of the new machines has a tub with corrugated panels in its sides like an old fashioned washboard. Rubbing the clothes against these ridges is said to hasten the washing action. Another has a series of indentations around the tub walls. An unusual gyrator in this machine co-operates with the uneven sides to squeeze the clothes as well as agitate them.

The new machines look trimmer and more

Here's how to make more money from *your* dairy

CUT COOLING COSTS... SAVE TIME AND WORK... REDUCE MILK SPOILAGE... WITH FRIGIDAIRE MILK COOLING EQUIPMENT

"Since installing Frigidaire, my savings on ice alone amount to $75 for 8 months. In addition I am relieved of any worry as to whether milk will keep. I have yet to lose a single bit of milk through spoilage."

H. O. VIRGIN,
Rumford, Me.

IT'S a fact that unless you are using Frigidaire Milk Cooling Equipment you're losing a lot of money that you might just as well have.

Saves $250 a Month

Take C. Albert Fox, (Pennsylvania) as one example. He says that the "$250 a month that this equipment saves for us is the margin between profit and loss." And Charles A. Sockwell, (Georgia) with a smaller dairy, states that "Frigidaire has *netted* us an average of $100 a month." These expressions are typical of the experience of hundreds of dairymen who know what Frigidaire Milk Cooling Equipment does for them.

But that isn't all. You save in many other ways. Less spoilage is one of them. H. O. Virgin, (Maine) writes, "I have yet to lose a single bit of milk through spoilage." And R. E. House, (Maine) tells us that he "has not lost a single quart due to warm temperature."

And you get these benefits... and many more... with a remarkable saving in time and labor. No more worry about ice... no more ice hauling and ice lugging... no more "icing up." For Frigidaire Milk Cooling Equipment is automatic... always on the job... working without thought or attention on your part.

"Paid for Itself in One Year"

And it pays for itself in a remarkably short time. M. Hartman, (Illinois) reports that his "Frigidaire has more than paid for itself and showed a surplus on the profit side of the ledger." And Chas. A. Sockwell, (Georgia) claims that his "Frigidaire has paid for itself in one year and my additional profit... has averaged $100 a month."

Isn't it worth your while to investigate? This won't cost you anything—nor place you under any obligation. Let us send you complete literature—FREE. Write... or mail the coupon. Frigidaire Corporation, Subsidiary of General Motors Corporation, Dayton, Ohio.

• • •

IF YOU SELL AT RETAIL GET THIS BUSINESS-BUILDING PLAN

Wouldn't you like to have customers for all the milk you can produce? Then get the facts about this amazing business-building plan. It's been tried, tested and proved. And we know it works! Let us give you the details... without cost or obligation. Mail the coupon.

IF YOU WANT TO MAKE MORE MONEY FROM YOUR DAIRY, MAIL THIS COUPON

FRIGIDAIRE CORPORATION,
Subsidiary of General Motors Corp.
Dept. T-24, Dayton, Ohio.

Send literature—FREE—on Frigidaire Milk Cooling Equipment.

☐ I sell at wholesale, averaging .....lbs. of milk per week.

☐ I sell at retail, averaging..... quarts per day, and I want the facts about your business-building plan.

Name.....

Address.....

FRIGIDAIRE

MILK COOLING EQUIPMENT

The air pressure dryer on one of the new washers.

graceful, too, because on so many of them the working parts are tucked up out of sight. The gears are safely enclosed on practically every machine, and even the motor is frequently hidden by the skirt of the base.

They run more quietly than ever. Motors are cushioned on rubber or mounted on springs to cut down the vibration, and that cuts down the noise. Incidentally, that rubber cushion also insulates the motor from the tub.

You can buy washers with cylinders inside to rock the clothes back and forth in the water, or washers with vacuum cups that move up and down and around the tub, flushing the soapy water through the clothes as they go down, and drawing it up again, dirt and all, as they rise. And you can buy washers with gyrators that kick or tumble or thrust the clothes through the water.

Gyrators have always varied in different washers, but this year they outdo themselves and appear in more shapes than a 1933 sleeve. Some are as tall as the center post; some are only a few inches high. One has holes along each blade to let the water slide through, sucking the clothes against the gyrator. One is like a section of a giant auger or a twisted metal ribbon with no individual blades at all.

Another gyrator is actually a little tub as deep as the center post, and, I should say, about a foot square. That is, it would be square except that the middle of each side bulges in, and the four rounded corners stick out. This little tub turns back and forth inside the big one and the corners act as the gyrator blades to churn the water and clothes along the full height of its sides.

This is the washer with the indentations around the tub wall. As the gyrator turns the clothes about, they are caught in the narrow area between the corner of the gyrator and one of these bumps on the inside of the tub. This squeezes them up, and as the gyrator slides past, they slip into the valley between the curves and are released again. The varying distance between the different parts of the agitator, the corner or the incurved sides, and the uneven tub wall, makes this squeeze-release-squeeze-release a continual process, many times a minute.

The manufacturer calls this hollow gyrator a compartment agitator. It is really a separate individual washer in itself. It will wash the lighter, more delicate pieces during a regular washing, or if you want to use it alone, it will do any of the special pieces you need to wash out between times. It can also be used for dry cleaning silk dresses or wool that we do not wash.

Several of the washing machines have been designed so they can take care of the small washing that comes every day when there is a baby in the house, or just the little things we like to wash out in the middle of the week. Two of them, the one whose gyrator is like an auger, and another with blades but a few inches high, will wash equally well, their makers tell us, when the tub is loaded just to the silk line and full to the regular water line.

In another machine, you can wash a few clothes in a small amount of water just by turning the gyrator upside down.

Still another washer inverts the gyrator and hangs it from the top of the center post, not for smaller washings, but to take care of extra heavy loads like blankets or quilts.

Another distinct improvement in the new machines is the rearrangement of the controls. They are easier to reach and quick and positive in action. On one machine the starting button is on top of the center post so it is always in front of you no matter where you stand. In another there are two slender buttons on the rim of the tub, one on either side of the wringer so you can always reach one of them easily when you are working at the ma-

This machine squeezes the clothes as well as agitates them.

chine. Either of them starts or stops the washer at the lightest touch, finger tip control, the makers call it.

The chief change I have discovered in the wringers, is a positive drive for the upper as well as the lower roll on one machine, and various new safety releases. Some of them are on either side of the rolls always within half an inch of your fingertips if you are feeding clothes through the wringer. These, or the bars on top of the wringer are made so they will stop the rolls instantly if you press them ever so lightly with hand or arm or elbow.

The machines with centrifugal dryers spin the water out of a whole load of clothes at once, and that while the second batch is washing in the tub. These dryers cannot wrench off the buttons nor enlarge a tiny rip. They take out more water than a wringer so the drying time on the line may be shorter.

A new water extractor unlike either wringer or spinner has appeared on one machine. It, too, presses the water out of a whole tub of clothes at once. It works by air pressure on a rubber ballon in a big bowl that hangs where the wringer usually stands. The rubber in this bowl is puncture proof, and very heavy and durable.

• • •

A Good Cup of Coffee

EVEN good cooks are apt to differ over a cup of coffee. They may agree on its smooth rich flavor, that it must be as clear as a dew drop and have the deep amber of a topaz; they all feel that its odor should tickle the nostrils with an irresistible aroma, but they do not agree on the best way to make a cup of coffee that fits this ideal.

It would be strange if they did. There are so many ways of doing it.

It begins with the coffee, of course. It must be good, and it must be fresh. As soon as coffee is exposed to the air, after it is roasted, it begins to lose its freshness and aroma. Manufacturers have done their part in preventing this loss by careful packing. We can preserve the coffee we buy by keeping it in an air-tight container, and we will serve ourselves best if we buy in small quantities—perhaps no more than a week's supply at a time.

Cleansing of Utensils Important

The utensils we use come next in importance. I do not mean their selection, but their care. They must be kept scrupulously clean to banish the ghosts of yesterday's coffee making. Washing with soap and water alone will not do it. It takes scrubbing with a fine scouring powder to remove the coffee oil that sticks to the inside of the pot. Percolators that are harder to scrub can be cleaned by boiling a solution of washing soda and ammonia in them. Of course, the pot needs a very careful rinsing after being washed like this.

Then comes the selection of the proper grind for the method we use to make our coffee. Fine ground coffee, about the consistency of corn meal, is used for the drip pots, and the medium grind called steel cut is best for percolated or boiled coffee.

Probably half the coffee troubles in the world

grow out of careless measurements, or more likely, no measurements at all.

If you would make a perfect cup of coffee, never guess at the amounts to use. Measure both coffee and water carefully; for coffee of average strength, use one heaping tablespoon of coffee for each cup of water.

Making coffee in a regular coffee pot on top of the stove is more than a matter of measurements, though. You cannot just dump the coffee in the water and go off and listen to the radio, not if you are on the trail of the perfect cup. Listen to what one firm of coffee importers says about this simple job of making a pot of boiled coffee.

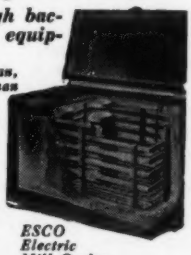
"Using one heaping tablespoon medium ground

(*Continued on page* 18)

"No Worry . . .

about milk cooling or high bacteria if you have ESCO equipment."

says C. R. Sheehan, Vermont Dairyman



ESCO Electric Milk Cooler

THOUSANDS of dairymen, like Mr. Sheehan, are praising ESCO Electric Milk Coolers and Utensil Sterilizers, as profit-makers that save on costs and labor.

The ESCO Electric Milk Cooler cools milk quickly to below 50 degrees and keeps it cold until shipped, at much less cost than ice.

Patent Pending

Electric Utensil Steriliser

The ESCO Electric Utensil Sterilizer destroys bacteria as it dries your cans and pails. No dirt, smoke or hazard from fire or steam.

You, too, can keep bacteria counts down and produce higher quality milk —with more profits—the ESCO way. Send for facts.

Use convenient coupon

ESCO CABINET CO. 4EF33
West Chester, Pa.

I make ..... cans of milk daily. Send full details in regard to:

( ) ESCO Milk Coolers
( ) ESCO Elec. Dairy Water Heaters
( ) ESCO Elec. Dairy Utensil Sterilizers

Name .....

Address .....

P O.....State.....

Questions and Answers

Conducted by
H. J. GALLAGHER

Question: *Is there a difference in the amount of heat given off by a 200 W. Lamp and a 200 W. Heating Element? Does the light in the lamp cut down on the heat? The question was brought up in reference to heating water for baby chicks.*

Chas. T. Craig

Answer: There is no difference in the amount of heat given off by a 200 watt mazda lamp and a 200 watt heating element. The ability to utilize the heat from the bulb, however, is another problem.

Question: *I heat twelve quarts of water once a day, to wash my milking machine, with a small immersion heater. I use a small foot tub and hang the heater over the edge. It is about seven inches long and hangs into the water about three and one-half inches. Would you buy a different heater and what kind would you buy?*

It heats the water to a little less than boiling in 1¾ hours. The point I have in mind is to save electricity.

The company that makes the P . . . . Milker makes a heater and the salesman for this company has stopped here and tried to sell me.

E. H., Burlington, Ill.

Answer: One objection to your heater is that it takes too long to heat the amount of water you use. A 2,000 watt immersion type heating element would heat the water to boiling in about forty minutes. The longer the heating process the greater the heat loss through radiation and conduction.

There are types of immersion heaters on the market that are a hazard to life. An immersion heater should never be used unless made by a reputable company. The P . . . . Heater which you mention is a good heater.

Question: *We have a ¼ H. P. motor and a pump in our house for bath and kitchen. Will you please tell us why our pump knocks every time in operation? Is there too much air, or not enough in the water tank? We must empty all the water out of the tank to stop the noise, but soon the knocking will start. When we open the air valve on the pump for only a turn then off, the pump will operate, but will not pump water for hours if we do not turn off the electricity. When we start, the pump will pump water, but knocking soon starts. Thanks for an answer.*

Mrs. F. A., Bird in Hand, Pa.

Answer: Pounding is an indication of a water logged tank, one not having enough air. A tank having too much air does not usually pound and air gushes at the faucets. There are several factors which may be the cause of the pounding:

The supply tank may be too small.

The discharge line from the supply tank may be too near the top of the tank so that air escapes.

The check valve in the pipe line between the pump storage tank, if an all metal valve, may clatter while the pump is operating.

If the pump is lower than the water level of the well, pounding results unless a stand pipe higher than the source of supply is used on the pipe line between the pump and well.

When a pump refuses to operate after the air valve has been opened, the trouble can usually be remedied by grooving the discharge valve of the pump slightly so that water can flow from the storage tank to the cylinders of the pump; otherwise, after the pump cylinder fills with air, the pistons merely expand or contract the air in the cylinder, instead of pumping water. There should also be a slight groove in the check valve between the pump and tank. The pump cylinder will then always be filled with water and will not lose its prime.

A Good Cup of Coffee

(*Continued from page* 17)

coffee and one-fourth tablespoon of beaten egg for each cup of cold water. Combine coffee and egg in pot and mix thoroughly. Pour in water and bring slowly to a boil, stirring coffee down occasionally. Remove from the fire immediately and let stand in warm place three to five minutes. Pour one-fourth cup of cold water into the pot to settle. Strain from the grounds through a fine wire strainer, muslin or cheesecloth."

Electric percolators that make the coffee on the table right at our elbow usually carry their own directions for coffee making. One coffee house of national reputation sets forth the secrets of percolated coffee like this.

"Slow, gentle percolation over a period of ten to fifteen minutes gives a beautifully clear, amber colored coffee of mild flavor and delicate aroma. Best results are obtained by making the full amount of coffee for which the percolater is designed. The water should come up over the base of the spout in order to have satisfactory percolation."

Drip coffee is the clearest brew of all. There are many kinds of pots for making it—glass, porcelain, and various metals. Some of them have perforated tops, and some have filters of cloth or paper. In some pots there is an electric heating element in the base to keep the coffee hot enough to drink, but never boiling, and in others electricity furnishes the heat to make the coffee.

To make regular drip coffee, the pot is preheated, coffee is put in the upper part, and fresh boiling water is poured over it. The pot is covered and left in a warm place until the water has dripped through once. Then the upper compartment is removed and the coffee is ready to serve.

In the urn in the picture an electric element heats the water in the lower part, pumps it up a tube so it drips back a little at a time through the coffee grounds into an upper compartment of the pot. It is drawn off from there.

The glass pot with one bowl on top of the other makes drip coffee on a different principle. To make coffee in this pot, you adjust the filter and the spring strainer in the upper bowl, then fill the lower bowl with water to within a couple of inches of the top of the neck, and put the coffee in the upper bowl. Set the bowl on the electric plate and turn on the current. The expanding steam pushes the water up into the upper bowl and you stir the brew about. Then remove the pot from the heating unit. As the air in the lower bowl cools, it contracts and leaves a vacuum. This draws the coffee down through the strainer into the lower bowl again, and the coffee is done.

Whatever the method you use, one last direction for the perfect cup lies in this warning:

"Serve at once."

ON THE AIR

Conducted by Jerome J. Henry

Gleaned Around the Studios

TED DI CORSIA who often played the part of President Herbert Hoover in the "March of Time" broadcast is often mistaken for Peter Arno, the famous artist.

* * *

Billy Hillpot and Scrappy Lambert, who made their debuts over CBS stations as the musical Smith brothers, refuse to accept the sound effects of radio. They still have their accompanying orchestra provide the sounds of galloping horses, charging locomotives, slamming doors and so on.

* * *

The recent CBS Five Star Theatre program, featuring Paul Althouse occasioned a reunion and no small amount of reminiscing between the tenor and Louis Dean, Columbia announcer assigned to the program. The two first met in Danville, Virginia, 13 years ago when Althouse appeared as guest soloist with the Randolph Macon School of Music chorus, of which Dean was a member. Seven years later Dean, as program director of station WGY in Schenectady, remembered the charm of Althouse's voice and persuaded him to sing on one of the station's featured programs.

* * *

Edgar A. Guest, who has been on the air Tuesday evenings reciting his famous poems, spends most of his spare time around the studios playing ping pong with the announcers.

• • •

Seven Threat Man in Dialogue

THE new nick-name of Art Van Harvey, "Seven threat man", was given the portrayer of Vic in the Vic and Sade sketches when it became known he is the master of seven dialects. All seven are "home talent" and Art is particularly proud of the fact that they are not "stage" dialects. Since childhood he has been known as a natural imitator.

Van Harvey picked up his Jewish in a Chicago ghetto. Since his mother is Irish and his family lived in an Irish neighborhood, he learned the brogue with ease. He still gets some practice with Italian. For 17 years he has had his haircut in the same barber shop. Swedish he acquired while joking with the janitors in an office building. The elevator boys furnished him ample material for a negro drawl. Art learned his German while sipping beer in the good old days, while Mrs. Van Harvey is the source of his Canadian French.

Art once wrote a series of 18 sketches for the radio and took the lead in each, using all seven dialects.

Right now he may be heard in the Vic and Sade programs broadcast several evenings each week over NBC stations. These episodes portray the everyday happenings in a small city family. So realistic are the presentations that hundreds of listeners write their expressions of feeling the same moods and personalities that are presented by the characters.

Ed East and Ralph Dumke, the Sisters of the Skillet. They devote their efforts to dispensing nonsensical advice and problem solutions to American housewives.

• • •

Compares Magic and Radio

BROADCASTING is a good deal like the magic business. So says Howard Thurston the magician whose illusions have entertained more than forty million people all around the world during his 30 years in the show business.

We work in split seconds in both businesses,

Easy to Increase Wool Profits

Machine shearing gets 10% more wool than hand blades. Machine sheared wool brings better price.

STEWART

Shear faster, easier by machine.

The One-Man

Belts to any engine. For any size flock. Easy to set up. Convenient in-and-out-of-gear arrangement. Will last a lifetime. Complete with the Stewart ball bearing handpiece, 2 combs and 4 cutters. $26.00 at your dealer's or send $2.00, balance on arrival.

Shearmaster

A wonderful motor-in-handle electric shearing machine. Motor runs on any 110 volt current. Also supplied for special current. Ideal for flocks up to 200 sheep or goats. $19.75 complete at dealer's or send $2. Bal. C. O. D. Satisfaction guaranteed.

Send for Free Illustrated Catalog

describing the complete Stewart Line, the world's largest, oldest line of shearing and clipping machines. Chicago Flexible Shaft Company, 5524 Roosevelt Road, Chicago.

$19.75

with 20 ft. of 3-lead rubber covered cord. Special voltages slightly more. Specify current you have.

"Sharlie is dere."—Baron Munchausen (Jack Pearl) and Sharlie (Cliff Hall), who is never dere when the Baron has his adventures but is always present when he tells about them, before the microphone at one of their Thursday night broadcasts over NBC stations at 10 p.m., Eastern time.

Thurston points out. The magician may now be heard on the air each Thursday and Friday evening. The great difference between radio and stage magic, Thurston contends, is that when a second is lost in broadcasting it is gone forever. If a second is lost in the magic business the illusion may still be saved.

"Many times when I saw the show getting a little behind I saved the day by saying, 'Excuse me please but I see an old friend of mine in the audience.' Then I walk down the runway and single out some individual who looks like a good sport and say, 'How are you, Joe? I haven't seen you since those old days in Calcutta. Come back to my dressing room after the show.'

"In those few seconds my assistants have caught up and the show moves on smoothly," Thurston explains.

But a second lost in broadcasting is a different matter, Thurston's experiences have proved. If a show is going to run too long the director revises and cuts it down. Sometimes whole pages are taken out of the script. But this is nothing new to Thurston since he's seen larger things than a page of manuscript disappear.

If a director sees the program is going to run over time when it is already on the air he enters the studio and in a deaf and dumb sign language tells the actors to cut out parts of it. Running overtime is the unforgivable sin of radio, for every feature must end "on the dot" to allow the next program to begin.

• • •

Baron Munchausen: "The boa constrictor ate three rabbits, then swallowed a dog."

Sharley: "On top of three rabbits: Why did he want the dog?"

Baron: "Oh, I guess he wanted a chaser."

• • •

Religious Programs Numerous

THE winter finds many religious programs of great interest on the air. The Hour of Worship, conducted by Dr. S. Parkes Cadman over an NBC-WEAF network reaches listeners at 3:30 p.m., Eastern time on Sundays. The National Youth Conference comes at 4:30 p.m., and National Vespers at 5:00, with the Catholic Hour being heard, also over NBC stations, at 6:00 p.m.

Dr. Cadman returned recently from the Geneva conference on World Peace Through the Churches. While in Europe he went on a tour which included several countries and addressed huge crowds in many cities on International friendship and world peace. This is his tenth year on the air.

One of the most outstanding contributions of the religious broadcasts is their service to shut-ins and persons in sparsely settled sections of the country who are enabled to listen to some of the foremost preachers of the day.

• • •

Seek Room Noise in Studio

THERE'S at least one radio program that not only tolerates, but actually seeks, utilizes, and capitalizes on the demon, "room noise."

"Room noise" is a bugaboo that harrasses broadcasters doing speaking parts in large studios. Its that hollow effect that sounds like when you speak with your head in a barrel. Many hours and many dollars have been spent in combating this foe of broadcasting.

But the "First Nighter" dramatic program that you may hear every Friday evening represents a typical New York theatrical night. The first thing the program demanded was realism. That meant an audience—which was supplied by inviting visitors to see the program. Then it needed the effect of a performance in a large room, a theatre. And here the much maligned and long fought "room noise" became a welcome studio property instead of a worry.

During most dramatic programs on the radio the actors perform in a large booth, which is a heavily draped tent like structure that kills echo and takes sounds into the microphone unmolested and undistorted.

The cast of the "First Nighter" plays immediately discarded the booth and faced the audience. Thus "room noise" was added to the applause of the crowd.

NEW WAY TO CHURN
Thousands are changing to this simple, convenient, modern way to churn. It's the famous DAZEY principle adapted to electrical operation. Ends the drudgery. Just turn the switch. Made in 2, 4, 6 and 10 gallon sizes.
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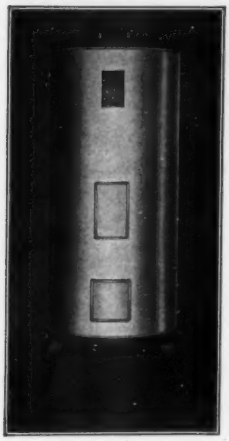
ST. LOUIS, MO.

What's New

Reviewed by T. E. HIENTON

Electric Water Heater

An adequate supply of hot water, available at any time with an automatic storage - type electric water heater, is a worth-while convenience in any residence. A new line of electric water heaters, with tank sizes of 30, 50, and 60 gallons, has been recently placed on the market. These heaters are thermostatically controlled with temperature adjustment between 140 and 200 degrees F. They are equipped with Monel metal tanks on which a 20-year guarantee will be issued and are made with single or multiple heating elements to meet the requirements of continuous, intermittent, or off-peak water-heating schedules. The heating elements are made of laminated steel, enclosed coil construction, and are interchangeable without draining the tanks or interrupting service.



Washer with Compartment Agitator

Three models comprise the new line of washers offered by a middle western manufacturer. Two models of this new washing machine have the compartment agitator which squeezes the clothes instead of stirring them as a machine equipped with the usual fin type agitator. The inner agitator compartment of this washer may be used for washing finer fabrics which require less washing time, while the outer section washes the heavier materials. It may also be used without the outer section when only a few pieces are being washed or as a dry cleaning machine. These washers are equipped with vertically hung motors permitting 100 per cent gear drive. Optional equipment on all models includes a motor-driven drain pump for ease in emptying them.

Electric Soil-Heating Cable

Electric soil heating is probably the most outstanding recent application of electric energy to agricultural use. Interest in heating hotbeds, propagating benches, and outdoor plots has spread from coast to coast and the awakening of this interest has resulted in many installations being made. Market gardeners, commercial florists, canning companies, and farmers who raise their own vegetables have all found this new method of heating hotbeds satisfactory.

A recent announcement of the manufacture of soil-heating cable by an eastern firm adds to the increasing list of firms now manufacturing this type of soil-heating unit. The cable is very similar to others of this kind in that the heating wire is No. 19 Nichrome with a resistance of slightly more than 0.5 ohms per foot, providing approximately 400 watts at 115 volts in 60-foot lengths. Felted asbestos, impregnated with special moisture and heat-proof compound, covers the heating wire and the whole is then covered with a 1/32-inch lead sheath, giving an overall diameter of 0.18 inch.

Fingertip Wringer Control Washer

Fingertip controls on each side of the wringer and the French type perforated, four-wing agitator are special features of one of the newest model washing machines. The agitator is placed in a slightly depressed safety well and is so designed that it prevents the clothes from tearing or tangling. Four corrugated panels, which act in much the same manner as the old type washboard, are built in the tub horizontally. A balloon type porcelain wringer, with the two controls, has four springs which control the wringer pressure and give maximum efficiency. A push and pull switch located on top of the splash ring is used to control the motor.

Electric Mixer

A new compact mixer which beats eggs, whips cream, and mixes very thin batters is a recent announcement. It is simple in operation and easy to clean but differs from many mixers in that there is no stand, the motor and housing resting on the mixing bowl. The special bowl is graduated in pints, cups, and ounces which makes it useful in measuring amounts of material. Electric equipment is for 100-125 volt, 60 cycle, alternating current only.

Postponement

When a worried-looking man applied for settlement of a claim for fire insurance, the agent asked: "Much damage?"

"Not much," the man said; "just a door."

"How much would a new door cost?"

"About five dollars."

"When did the fire happen?"

The man hesitated a moment, and then replied: "About thirty years ago."

"Thirty years ago?"

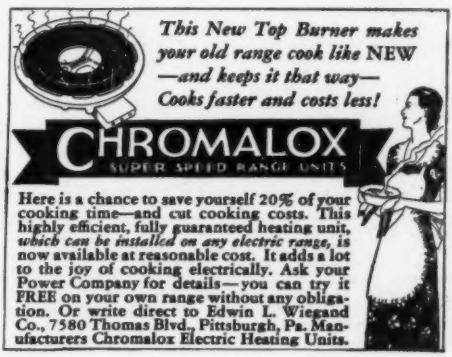
"Yes."

"And you've waited all these years to report it?"

"Yes."

"How did that happen?"

"Well," said the man, "my wife has been at me to do something about that door ever since it was burned, and I couldn't stand it any longer."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Under The CHESTNUT TREE

Grasping the Opportunity

Through a severe cross-examination the defendant had maintained that he had punished his victim only a "little bit."

"Well, about how hard?" asked the prosecuting attorney.

"Oh, just a little bit," repeated the prisoner.

"Now," replied the lawyer, "for the benefit of the judge and the jury just step down here and, with me for the subject, show just how hard you mean."

The prisoner leaped down, slapped the lawyer in the face, seized him bodily, and finally, with a supreme effort, lifted him from the floor and hurled him across a table.

Then he turned to the judge and said: "Your honor and gentlemen, about one-tenth that hard."

Willing to Help

"I only wish," said the teacher, exasperated by the naughtiness of one of her small pupils, "that I could be your mother for a week."

"All right," replied the youngster, coolly, "I'll speak to father about it."

Leaping Lantern

'Twas a dark and stormy night. The trainman was signalling the engineer when he dropped his lantern to the ground. Another man tossed it up to the man on the box-car.

In a few minutes the engineer, a new man, came rushing up on the scene. "Let's see you do that again," he said.

"Do what?"

"Jump from the ground to the top of that box car."

Disguised

Pedestrian (To boy leading a skinny mongrel pup): "What kind of a dog is that, my boy?"

Boy: "This is a police dog."

Pedestrian: "That doesn't look like a police dog."

Boy: "Nope, it's in the Secret Service."

The Ingenuous Cook

"How did you make these nice scallops on your pies, Mandy?"

Mandy: "Oh, I jes' used mah false teeth."

Filling His Niche

Friend: "What is your son taking up at college this year?"

Dear Old Dad: "Space—nothing but space."

—Chelsea Record.

Daughter: "Dad, what is your birthstone?"

Father of Seven: "My dear, I'm not quite sure, but I think it is a grindstone."

Talkativeness

A woman called at a studio for a sitting. The photographer made two negatives and promised proofs for the following day. The next day her husband called for the proofs, but the photographer showed him only one. The husband said: "My understanding was that there were to be two proofs."

"I did make two sittings of your wife," said the photographer, "but in one she held her lips apart and showed the end of her tongue."

"My goodness!" gasped her husband. "Let me see that one. I didn't know there was an end to it."

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Here is a partial list of tried and proven equipment and the names of manufacturers who can give you valuable assistance.

It will pay you to read their advertising carefully and write for the free literature they offer.

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February Cover

FRONT COVER TITLE CONTEST

Winners for February

1st Prize $25

"The endless work, the hopeless tangle,
Is all smoothed out by the electric mangle."

MRS. EUGENE HUTCHINGS
Barlow, Ore.

The following have been awarded $5.00 cash prizes:

"The end of drudgery is foreseen with the electric ironer and washing machine."

CLIFFORD J. MILLARD,
R. F. D. 6, Lowville, N. Y.

"Without electricity what would she do? She thinks, as she runs her ironing through."

MRS. WILLIAM E. SMITH,
Pineville, Penna.

"The old sad iron has had its day, Thanks to the electric mangle way."

MRS. HELEN REIFF,
R. F. D. 1, N. Manchester, Ind.

"Do not stand over the ironing all day, Sit down and iron the electric way."

PHYLLIS LASH,
R. F. D. 2, Avilla, Ind.

"Put your old iron and board away,
Sit down and iron the electrified way."

DONNA HANSEN,
R. R. 2, Hammond, Wis.

RULES FOR APRIL CONTEST

THE RULES ARE SIMPLE—BUT READ THEM CAREFULLY

All members of the farm family to whom this magazine was sent may submit titles, but each contestant may submit only one title.

Titles should not be longer than 15 words—the shorter the better—and they need not be rhymes.

Question "A" must be answered correctly.

Send your title on the coupon below or make out a similar form on a plain sheet of paper or government post card.

Entries must be sent to the Title Editor, ELECTRICITY ON THE FARM, 6 No. Michigan Ave., Chicago, Ill., before May 1st. Winning names and titles will be announced in the June issue.

The first* prize will be $20 cash and nine second prizes of $2 in cash will be awarded. In case of a tie, each winning contestant* will receive the full cash prize to which he or she is entitled.

Follow these simple rules. Your editor cannot answer letters about the contest.

My title for the April Front Cover picture of ELECTRICITY ON THE FARM is .....

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(a) What electrical appliances or equipment have you obtained during the past six months? .....

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My Name is ..... R. F. D. .....

Post Office ..... County ..... State .....

4-33

YOU DON'T NEED TO LEAD THE HORSE TO WATER!

IT is far easier and it costs less also to lead the water to the horse.

What is more important you can also lead the water to the cows and other livestock, so that they can drink whenever they please, and to the kitchen and the bathroom in the house to make life more pleasant for the family.

With water on tap your livestock becomes more productive. It is legal to water your milk, if you give the water to the cows.

Running water throughout the home brings not only greater comfort but makes also for healthier living. The back-breaking drudge of lugging water from the well can be banished forever.

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